

The California Lighting Technology Center (CLTC) at UC Davis is a non-profit R&D facility dedicated to advancing electric building systems and control technology for decarbonization, grid resiliency, and community well-being.

CLTC features full-scale laboratories for research, product testing, and prototype development. In collaboration with designers, manufacturers, utilities, and government agencies, CLTC develops energy-efficient building controls, pre-commercial products, and policy guidelines.

The center also provides engineering specs, market research, resources, and publishes case studies and reports on technology demonstrations. CLTC faculty offer education courses, workshops, and outreach activities.

## Project Portfolio



CLTC partnered with CalNEXT to research REA systems, which integrate home-energy monitoring, automated appliance management, and distributed energy resources (DER) like EV chargers, solar panels, and stationary batteries. These systems improve energy efficiency, reduce peak demand, and offer load flexibility through islanding homes and utilizing mobile BES for added grid capacity. REA systems enhance grid resiliency by switching to local battery storage during outages, marking the next evolution in smart-home technology.



CLTC is leading a \$5.3 million project, funded by the California Energy Commission's EPIC Program and project partners, to demonstrate V2B mobile battery energy storage at a Caltrans facility in Oakland. The project equips heavy-duty electric vehicles (HDEVs) with V2B capabilities for energy power and installs bidirectional DC rapid charging stations. This initiative aims to evaluate the use of HDEVs as emergency backup power for critical commercial operations while supporting community safety and clean energy goals.





## BUILDING CONTROL TECHNOLOGIES

## Project Portfolio, Continued



CLTC conducts research to refine and deploy strategies for automated controls integrating HVAC, electric lighting, and dynamic fenestration systems in commercial buildings. Preliminary results show that the system reduced HVAC, lighting, and shading loads by 10–40%, depending on the building's characteristics and control strategies utilized. Occupancy-based control integration provided cost-effective solutions with a payback period of fewer than three years.



CLTC is a key partner in the California Load Flexibility Research and Development Hub (CalFlexHub) which brings together experts from across industry, utilities, academia, and non-profits. CalFlexHub accelerates the development and demonstration of pre-commercial energy efficiency and distributed energy resource technologies. CLTC's role focuses on advancing demand-flexible lighting technologies that are grid-integrated, interoperable, and adaptable to California's evolving energy landscape.



CLTC provides comprehensive training programs that equip apprentice electricians with essential skills for modern building systems, including advanced lighting and building controls, cybersecurity, and energy management. Through these programs, apprentices learn key strategies to stabilize the electric grid and reduce energy demand in commercial buildings. These skills are essential as California continues to expand its use of renewable energy sources and improve grid resilience.



CLTC develops best practice guides, instructional videos, and classroom curriculum to teach California Energy Code requirements for lighting controls. These resources offer clear, actionable recommendations, real-world examples, and insights into the latest lighting technologies, energy-efficient strategies, and lighting design principles, helping professionals easily navigate code compliance and optimize building performance.

